

## 5.4 – Defining Trigonometric Ratios

- $\tan \theta$  – a constant value based on the ratio of the length of the side opposite to a chosen angle  $\theta$  to the length of the side adjacent to angle  $\theta$  in a right triangle
- $\sin \theta$  – a constant value based on the ratio of the length of the side opposite to a chosen angle  $\theta$  to the length of the hypotenuse in a right triangle
- $\cos \theta$  – a constant value based on the ratio of the length of the side adjacent to a chosen angle  $\theta$  to the length of the hypotenuse in a right triangle

# Trigonometric Ratios

- Trigonometric ratios - constant values based on the ratios of sides for particular angles in right-angled triangles
- Ex: tan, cos, sin

## SOHCAHTOA

$$\text{Sin } \theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$$

$$\text{Cos } \theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$$

$$\text{Tan } \theta = \frac{\text{Opposite}}{\text{Adjacent}}$$

- $\tan \theta = \frac{\text{length of side opposite to angle } \theta}{\text{length of side adjacent to angle } \theta}$

" $\tan \theta$ " is read as "tangent of angle  $\theta$ "

- $\sin \theta = \frac{\text{length of side opposite to angle } \theta}{\text{length of hypotenuse}}$

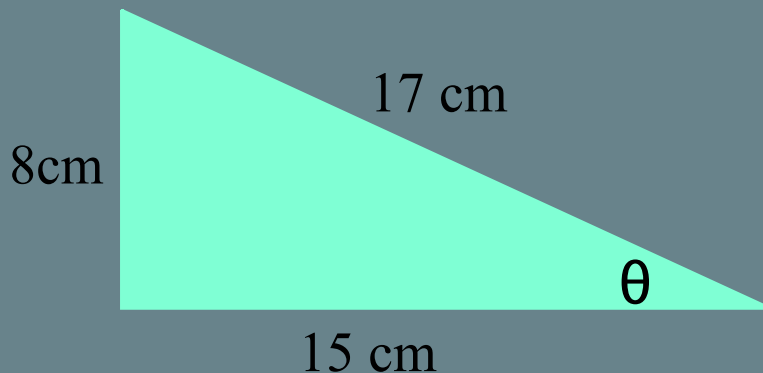
" $\sin \theta$ " is read as "sine of angle  $\theta$ "

- $\cos \theta = \frac{\text{length of side adjacent to angle } \theta}{\text{length of hypotenuse}}$

" $\cos \theta$ " is read as "cosine of angle  $\theta$ "

Copy the following example:

Calculate the values for  $\sin\theta$ ,  $\cos\theta$ ,  $\tan\theta$



- First, label the sides as either adjacent, opposite, and hypotenuse.
- To calculate the values on your calculator:
  - Example: To find the value of  $\theta$  using  $\sin$

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\sin \theta = \frac{8}{17} \quad \text{(Divide 8 by 17)}$$

$$\sin \theta = 0.4705882353$$

**To find the value of  $\theta$ :**

-with the above number on your calculator, press 2nd function  $\sin$  (this should be  $\sin^{-1}$ )

$$\theta = \sin^{-1}(0.4705882353)$$

$$\theta = 28.1^\circ$$

### NOTE:

- Depending on the side lengths given you need to use either sin, cos, or tan.
- The trig ratios can only be used with right angle triangles.
- Each side length must be in the same units
- For help with any of the questions make sure to refer to the notes for help, as well as the example

## Classwork/Homework

- Yellow text:  
Pg. 276 #1,2
- Our Text:  
Pg. 236-237  
#12, 13a, 14ab, 15ab

# SOHCAHTOA

- Remember what this stands for!
- Complete the trigonometric Ratios Worksheet.



# Please take out the Trig worksheet

$$1) \angle u = 68.47^\circ$$

$$2) \tan B = \frac{5.1}{3.6} \quad \angle B = 54.78^\circ$$

$$3) \sin T = \frac{0.28}{0.41} \quad \angle T = 43.07^\circ$$

$$4) \sin T = \frac{8}{8.62} \quad \angle T = 68.13^\circ$$

$$5) \cos Y = \frac{3.8}{4.55} \quad \angle Y = 33.36^\circ$$

$$6) \tan R = \frac{0.76}{2.5} \quad \angle R = 16.91^\circ$$

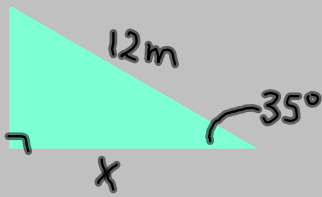
$$7) \tan Y = \frac{10.7}{18} \quad \angle Y = 30.73^\circ$$

$$8) \cos R = \frac{21.5}{29.26} \quad \angle R = 19.97^\circ$$

$$9) \sin x = \frac{0.97}{4.12} \quad \angle x = 13.62^\circ$$

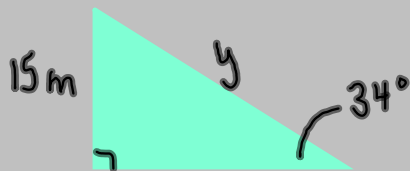
## Using the Trig Ratios to solve for side lengths:

Example:



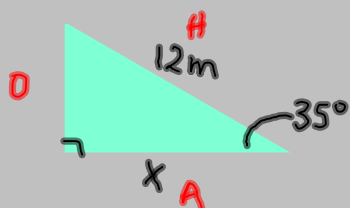
- Label the O, A, H
- Choose correct ratio
- fill it in

Example #2:



## Using the Trig Ratios to solve for side lengths:

Example:



- Label the O, A, H ✓
- Choose correct ratio Cos
- fill it in

SOH CAH TOA

$$12 \cdot \cos 35^\circ = \frac{x}{12} \cdot 12$$

$$12 \cos 35^\circ = x$$

$$x = 9.83$$

$$x = 9.8\text{m}$$

Example #2:



$$y \cdot \sin 34^\circ = \frac{15}{y} \cdot y$$

$$\frac{y \sin 34^\circ}{\sin 34^\circ} = \frac{15}{\sin 34^\circ}$$

$$y = \frac{15}{\sin 34^\circ}$$

$$y = \frac{15}{0.559192903}$$

$$y = 26.82$$

$$y = 27\text{m}$$

Please take out the Trig worksheet from yesterday.  
We are going to be switching them and marking them.

- E) 1.  $x = 5$   
 2.  $x = 87$   
 3.  $x = 15$   
 4.  $x = 40$   
 5.  $x = 44$   
 6.  $x = 4.5$   $x = 45$

F) 1.  $\cos 35^\circ = \frac{x}{12}$   $x = 9.8m$

2.  $\cos 50^\circ = \frac{24}{x}$   $x = 37.3m$

3.  $\sin 46^\circ = \frac{x}{13}$   $x = 9.4cm$

G) 1.  $\cos 28^\circ = \frac{y}{24}$   $y = 21.2cm$

2.  $\sin 34^\circ = \frac{15}{y}$   $y = 26.8dm$

3.  $\sin 47^\circ = \frac{y}{32}$   $y = 23.4mm$

H) 1.  $\tan 58^\circ = \frac{z}{14}$   $z = 22.4dam$

2.  $\tan 60^\circ = \frac{3}{z}$   $z = 1.73m$

3.  $\tan 35^\circ = \frac{19}{z}$   $z = 27.1$

I) 1.  $\sin 30^\circ = \frac{x}{8}$   $x = 4m$

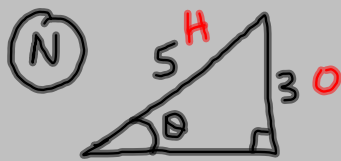
2.  $\tan 50^\circ = \frac{x}{7}$   $x = 8.3m$

3.  $\cos 53^\circ = \frac{12}{x}$   $x = 19.9cm$

4.  $\sin 45^\circ = \frac{x}{100}$   $x = 70.7m$

5.  $\sin 36^\circ = \frac{4}{x}$   $x = 8cm$

6.  $\cos 40^\circ = \frac{15}{x}$   $x = 19.6m$



$$\sin \theta = \frac{3}{5}$$

2nd

$$\theta = 36.869$$

$$\theta = 37^\circ$$

## Using a Calculator or Tables to Find Trigonometric Ratios

- You can find sine, cosine, and tangent values by drawing triangles and measuring.
- You can also use either the functions whose values are stored in a scientific calculator or you can use a trigonometric table of values for trigonometric ratios (p.238 or back of book)
- Try Page 239 #18-25

## Math 10 - Thursday, May 7th

- Warm-up
- Pass in pizzaz worksheets and assignment to me (not in bin)
- Work on Orange textbook questions
- If you have any questions about any trig material that has been covered, make sure to ask me about it today in class!
- Reminder: Trigonometry Test Tomorrow

### Warm-up

Draw a diagram for the following question and show ALL work.

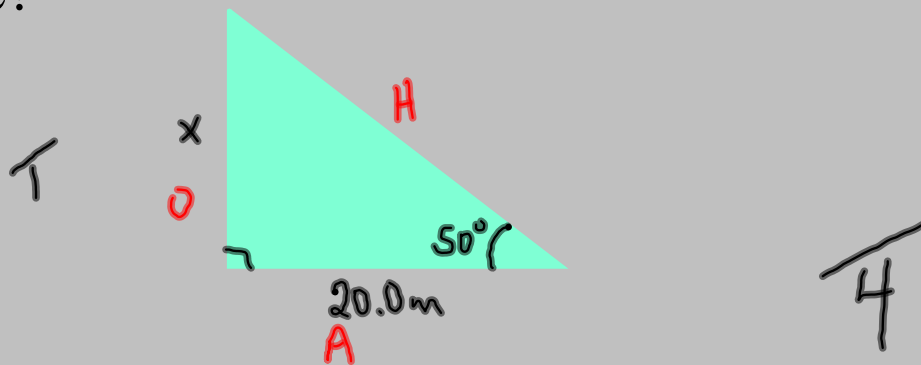
The shadow of a tree is 20.0m long. The angle from the ground to the top of the tree is  $50^\circ$ . How tall is the tree?



## Warm-up

Draw a diagram for the following question and show ALL work.

The shadow of a tree is 20.0m long. The angle from the ground to the top of the tree is  $50^\circ$ . How tall is the tree?



$$\checkmark \quad \tan 50^\circ = \frac{x}{20.0}$$

$$\begin{aligned} \checkmark \quad x &= 20.0 \tan 50^\circ \\ x &= 23.8 \text{ m} \\ &\quad \uparrow \quad \uparrow \end{aligned}$$

**Classwork/Homework:** Using the orange Principles & Process grade 10 book complete the following questions.

Page 469

- 4 - complete all primary trigonometric functions for reference angle  $A$  each of the questions.
- 5, 6 a, and b, 7 a, 8, 10 a, b

Page 473

- 1 a to e (inclusive) - use the calculators to solve, check the table on page 471 to see if your answers are correct.
- 8 a - d (inclusive)
- 9 a, 11

